



## NJBK10 Motor Protection Relay

### 1. General

NJBK10 series motor protection relay (hereinafter referred to as the protector) suitable for AC 50Hz, rated insulation voltage up to 690V and under, rated working current 1A-200A long-term or intermittent AC motor work overload, open-phase, three-phase imbalance protection. Product meets IEC60947-4-1 standard requirements

### 2. Type designation

N JBK 10 - □ / □

Control supply voltage  
Rated current specifications: 10:1 A-10A,  
50:5A-50A, 200:20A-200A  
Design sequence No.  
Motor protection relay  
Company code

### 3. Operating conditions

- 3.1 Altitude: not exceed 2000m;
- 3.2 the surrounding air temperature of  $-5^{\circ}\text{C}$  -  $+40^{\circ}\text{C}$ , and the average value within 24h does not exceed  $+35^{\circ}\text{C}$ ;
- 3.3 atmospheric conditions: the highest temperature of  $+40^{\circ}\text{C}$ , relative air humidity not exceeding 50%, lower temperatures can be allowed to have a higher relative humidity, for example, air humidity up to 90% at  $+20^{\circ}\text{C}$ , and special measures should be taken against the condensation occasionally due to temperature changes;
- 3.4 Pollution level: 3;
- 3.5 Mounting surface and the vertical gradient of not more than  $\pm 5^{\circ}$ ;
- 3.6 In medium without danger of explosion and medium gas not enough to corrode metal or destroy insulation and where much conductive dust exist;
- 3.7 Places with anti-rain and snow equipment and not full of water vapor;
- 3.8 in the absence of significant shake, shock and vibration;
- 3.9 Installation Category: II;
- 3.10 Electromagnetic Environment: A;
- 3.11 Casing protection grade: IP20.

#### 4. Technical data

4.1 Main circuit: Rated insulation voltage AC690V Rated frequency 50Hz, rated operating current of 1A-200A.

Table 1

Model	Rated current specification	Rated current range A	Suitable for motor power kW
NIBK10-10	10	1A-10A	0.5kW-5kW
NJBK10-50	50	5A-50A	2.5kW-25kW
NJBK10-200	200	20A-200A	10kW-100kW

4.2 Auxiliary circuit: Rated insulation voltage AC380V Rated frequency 50Hz, auxiliary contacts parameters

Table 2

Utility Category	Rated current range A		
Rated operating voltage (V)	240		380
Rated operating current (A)	1.5		0.95
Conventional thermal current (A)		5	

#### 5. Structural characteristics

5.1 Double-row LED display, the upper row of LED displays running current, bottom row of LED displays set current, the indicator lights indicate the operating status and fault status;

5.2 Features overload given time protection (on/off), inverse time overload protection, open-phase, three-phase current unbalance protection function;

5.3 Built-in 4 overload curves are available to meet different occasions;

5.4 Panel with start and stop buttons, terminal block can be external connected with start and stop buttons with simplified wiring;

5.5 Auto-start function can open the auto-start function and set the start-up delay. In case of power resumption or reset after power failure, the protector start automatically as per the set auto start delay, free of any human intervention;

5.6 Fault memory and its indications: In case of motor failure, the indicator displays the fault type, while the bottom row LED flashes and displays the fault code;

5.7 Mouning mode: screw mounting.

#### 6. Protection characteristics

6.1 Inverse time operation characteristic

When the current value exceeds the 1.1 times the set current value, the protector will start the inverse overload protection function. The protector shall simulate the calculation of the motor heat accumulation and movement time according to the overload current multiples. When the heat accumulation reaches a certain value, the protector acts to cut off the AC contactor, so as to protect the motor.

The relationship between the overload current and the time are shown in Table 3, Figure 1.

Table 3 inverse time operation characteristic table

Overload curve	Overload multiple								Remark
	Action time (s)	1.05	1.2	1.5	2	5	6	7.2	
Kr=1	No action	63	40	22	3.6	2.5	1.8	Meet the 5 level	
Kr=2	No action	125	80	45	7.2	5	3.5	Meet the 10 level	
Kr=3	No action	250	160	90	14	10	6.9	Meet the 10 level	
Kr=4	No action	500	320	180	29	20	14	Meet the 20 level	
Kr=5	No action	750	480	270	43	30	21	Meet the 30 level	

6.2 phase failure and unbalanced action time 3s, with a relative error of ± 10%, unevenThe balance rate can be set, unbalance ratio is calculated as follows:

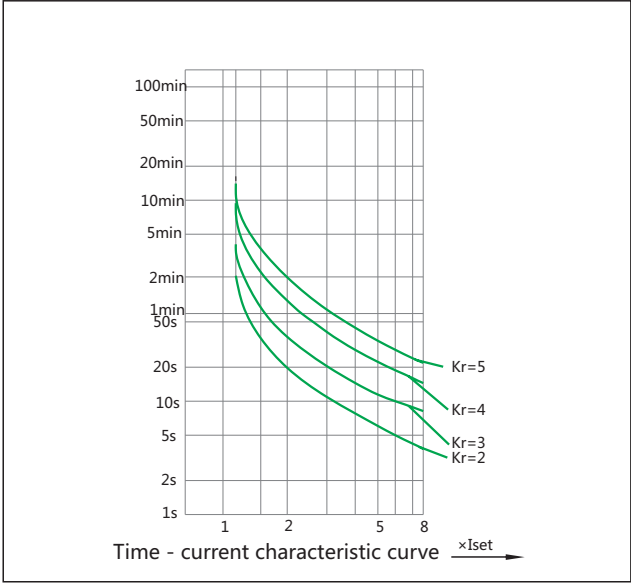
$$\text{Unbalanced ratio} = \frac{\sum_{i=1}^3 \max[I_i - I_{avg}]}{I_{avg}} \times 100\%$$

Where:

$I_i$  - Each phase current RMS

$I_{avg}$  - Three-phase current average

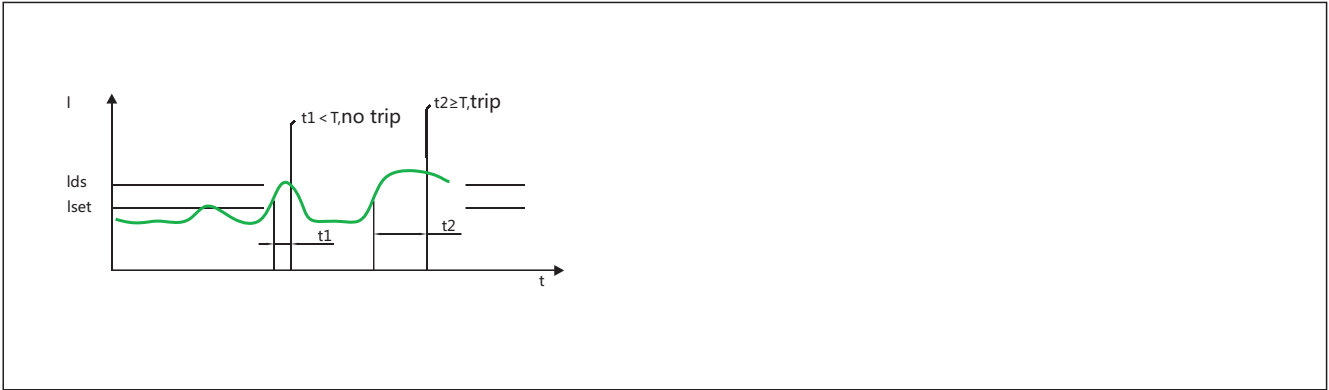
Figure 1 time - current characteristic curve



6.3 definite time operation characteristic

When definite time function is open, set definite time overload magnification and definite time time, if the running current ≥ set overload current × magnification and exceeds the set definite time, the protector shall act, as shown in Figure 2.

Figure 2 Definite time characteristic diagram



Note: Iset expresses the set current  
 $I_{ds} = I_{set} \times \text{definite time magnification}$  T expresses the set definite time



### 7. Wiring diagram

7.1 Control power voltage AC220V wiring diagram in Figure 3 Control power voltage AC380V wiring diagram in Figure 4.

Figure 3 control supply voltage AC220V wiring diagram

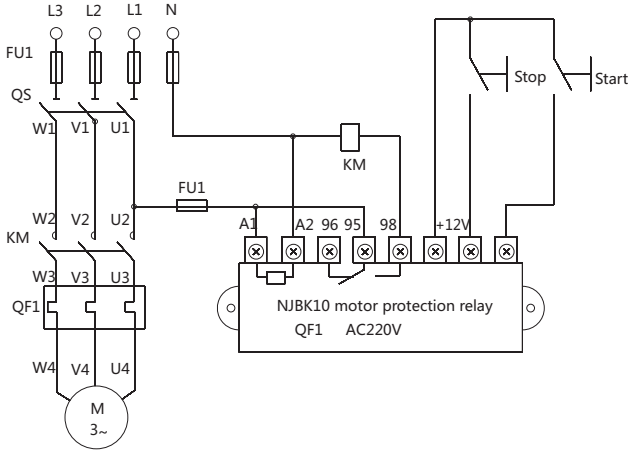
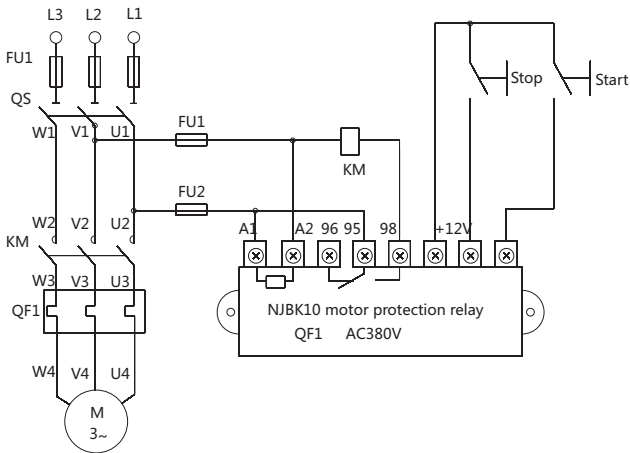
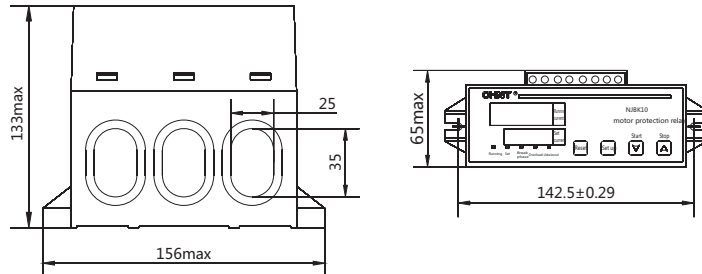


Figure 4 Control supply voltage AC380V wiring diagram



## 8. Overall and mounting dimensions (mm)

Figure 5 Outside shape and dimensions



## 9. Ordering information

9.1 Description and model specifications of the protector, the control supply voltage (AC220V, AC380V) selected according to the requirements for use.

Setting current range (1A-10A, 5A-50A, 20A-200A);

9.2 Ordering Quantity.